

EXAMINER'S AMENDMENT

This action is in response to the communication filed 5/11/2009.

An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.

Authorization for this examiner's amendment was given in a telephone interview with John T. Kalnay on June 3, 2009.

The application has been amended as follows:

Claim 1 (Currently Amended): A method, comprising steps of:

providing in a router a database of bindings of client devices to network applications to replicas of a network application, where a client device establishes a session with a replica of a network application, where the session includes a session state, where a binding includes a binding expiration time, and where the router is a first router of a plurality of routers associated with a network in which the network applications run;

maintaining a change log of records entered into the database, where a change log entry has a change event generated by the first router and an event number sequential to an event number of a preceding change event in the change log;

maintaining a current version vector associated with the database and the change log, the current version vector entry for the first router being a most

recent event number from the change log, the current version vector entry for each other router being a most recent event number received at the first router from that other router;

receiving an update of change events generated at another router in the plurality;

reconciling the current version vector according to the received update,
wherein the step of reconciling the current version vector comprises the steps of:

comparing a least recent event number of the router that generated the update to the event number in the current version vector entry for that router;

if the least recent event number is in series with the event numbers in the database as determined by the current version vector entry for that other router, then entering the most recent event number of the received update into the current version vector entry for the router that generated the update of change events; and

if the least recent event number in the update is not in succession to the event number in the current version vector entry for the router that generated the update of change events, then discarding the received update.

reconciling the database according to the received update such that the client session is maintained; and

providing a consistent DNS binding to a set of related application connection requests from a client device, where the set of related application connection requests request access to a network application having multiple replicas in a distributed network environment, and where the set of requests are associated with a single session established between the client device and a single replica of the network application.

Claim 5 (Canceled).

Claim 6. (Currently Amended). The method of claim ~~5~~ 1 wherein the step of reconciling the database further comprises:

if the update was not discarded in the step of reconciling the current version vector, then for each entry of the received update,

- a) determining whether the received entry has expired;
- b) if the received entry has expired, then discarding the entry;
- c) if the received entry has not expired, then comparing the request identifier of the received entry with the request identifier in the entries in the database;
- d) if a matching entry is not found for the received entry, adding the received entry to the database;
- e) if a matching entry is found for the received entry, then comparing the application identifier of the received entry with the application identifier of the matching entry;
- f) if the application identifiers match, then retaining the entry having a later expiration time in the database; and

g) if the application identifiers do not match, then retaining an entry selected based on a deterministic function applied to a portion of each entry.

Claim 13. (Currently Amended) The method of claim 5 1 wherein the step of reconciling the database further comprises the steps of: determining from the received update whether the database has a complete record of changes based on the current version vector; if the database does not have a complete record of changes, requesting a replacement database from a router of the plurality of routers.

Claim 21. (Currently Amended) A system to maintain a client session between a client device and a replica of a network application running in a network having a plurality of routers, comprising:

a network interface to receive a request from a client to access the network application

wherein the network interface is configured to receive an update of change events for the database from another router in the plurality of routers in the network; and

the controller is further configured to reconcile the database according to the received update and to update the current version vector in response to reconciling the database.

wherein to reconcile of reconciling the current version vector comprises the steps of:

comparing a least recent event number of the router that generated the update to the event number in the current version vector entry for that router;

if the least recent event number is in series with the event numbers in the database as determined by the current version vector entry for that other router, then entering the most recent event number of the received update into the current version vector entry for the router that generated the update of change events; and

if the least recent event number in the update is not in succession to the event number in the current version vector entry for the router that generated the update of change events, then discarding the received update.

a storage device to store a database of bindings, where a binding relates the client device to the network application to a replica of the network application, where the client device is identified by an IP address, where the replica is identified by an IP address, and where the network application is identified by a DNS name, and where a binding includes a binding expiration time, the storage device to further store a change log and a current version vector associated with the change log where the change log includes records added to the database by the system and the current version vector has an entry for each router in the network, each entry storing a version vector of a particular router; and

a controller coupled to the interface and the storage device, the controller configured to route the request, if the controller finds a binding matching the request, the controller to route the request to a replica of the network application according to the binding and to reset the binding expiration time in the binding, if the controller does not find a binding matching the request, the controller to add a new record to the database of bindings.

Claim 22 (Canceled).

Allowable Subject Matter

Claims 1-2, 4, 6-21, 23 are allowed.

The following is an examiner's statement of reasons for allowance: Independent claim 1 or 21, when considered as a whole, is allowable over the prior art of record. Specifically, prior art of record fail to clearly teach or fairly suggest the combination of following features:

maintaining a current version vector associated with the database and the change log, the current version vector entry for the first router being a most recent event number from the change log, the current version vector entry for each other router being a most recent event number received at the first router from that other router;

receiving an update of change events generated at another router in the plurality and reconciling the current version vector according to the received update, wherein the step of reconciling the current version vector comprises

comparing a least recent event number of the router that generated the update to the event number in the current version vector entry for that router and if the least recent event number is in series with the event numbers in the database as determined by the current version vector entry for that other router, then entering the most recent event number of the received update into the current version vector entry for the router that generated the update of change events, and if the least recent event number in the update is not in succession to the event number in the current version vector entry for the router that generated the update of change events, then discarding the received update.

The dependent claims further add limitations to the allowable subject matter of the corresponding independent claims; thus are also allowable.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to TUAN-KHANH PHAN whose telephone number is (571)270-3047. The examiner can normally be reached on 4/5/9.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Don Wong can be reached on 571-272-1834. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

TKP

/Hung T Vy/

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